

## Didactic aspects of the academic discipline "History and methodology of mathematics"

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### Abstract

© Authors. The purpose of this article is to develop the content and methods, as well as the analysis of the approbation of the program of the academic discipline "History and methodology of mathematics" for graduate students of the Master's program of mathematical program tracks. The leading method in the study of this problem was the method of modeling the work program of the academic discipline "History and methodology of mathematics", as well as the selection and structuring of the system of classes of different types, which allowed us to generate a logically constructed course. The structural model of the curriculum "History and methodology of mathematics" has been developed and presented; the selection and structuring of this course has been carried out, which combines such meaningful lines interwoven with time and history as: 1) history of mathematics, 2) history of mathematical education, 3) philosophy of mathematics, 4) methodology of mathematics; the types of classes on selected topics have been offered; the examples of the successful implementation of creative ideas are given which can be adopted and taken as a basis by other academic researchers. The competent teaching of the academic discipline "History and methodology of mathematics", based on the developed work program with the application of the proposed forms of classes, broadens the scientific horizons of graduate students of mathematical and pedagogical program tracks and allows them to focus on educational, scientific and methodological types of the future professional activity. The materials of the article can be useful for graduate students of mathematical program tracks for teaching university teachers of mathematics.

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### Keywords

Higher education, History of mathematics, Mathematics, Methodology of mathematics

### References

- [1] Alexandrov, A.D. (1964). Mathematics.Philosophical Encyclopedia,3, 329-335
- [2] Archila, P. A. (2015). Using History and Philosophy of Science to Promote Students' Argumentation.Science & Education, 24:9, 1201-1226
- [3] Bourbaki, N. (1963). Essays on history of mathematics. Moscow: Foreign Literature Publishing House
- [4] Charalambos, Y. C., Panaoura, A., &Philippou, G. (2009).Using the history of mathematics to induce changes in preservice teachers' beliefs and attitudes: Insights from evaluating a teacher education program.Educational Studies in Mathematics, 71, 161-180

- [5] Daan-Dalmediko A. & Peyffer J. (1986). Paths and labyrinths: Essays on history of mathematics. Moscow: Mir
- [6] Depman, I.Ya. (1965). History of arithmetic. Moscow .Prosveschenie
- [7] Eren, M., Bulut, M., & Bulut, N. (2015). A Content Analysis Study about the Usage of History of Mathematics in Textbooks in Turkey. EURASIA Journal of Mathematics, Science and Technology Education, 11(1), 53-62
- [8] Furinghetti, F. (2007). Teacher education through the history of mathematics. Educational Studies in Mathematics, 66(2), 131-143
- [9] Gindikin, S.G. (2001). Stories about physicists and mathematicians. Moscow: Moscow Center for Continuous Mathematical Education
- [10] Gomes, S. C. (2013). Teaching trigonometry using an historical approach: an educational product. Bolema, 27(46), 563-577
- [11] Heering, P. (2014). Historical Approaches in German Science Education. EURASIA Journal of Mathematics, Science and Technology Education, 10(4), 249-255
- [12] Klekovkin, G.A. (2012). Thoughts of mathematicians about the process of mathematical creativity as the basis of mathematical education. Mathematical bulletin of pedagogical universities and universities of the Volga-Vyatka region, 14, 7-21
- [13] Kline, M. (1984). Mathematics. Loss of certainty. Moscow: Rimis
- [14] Kline, M. (1988). Mathematics. The search for truth. Moscow .Rimis
- [15] Kolmogorov, A.N. (1954). Mathematics. Great Soviet Encyclopedia, 26, 464-483
- [16] Kolmogorov, A.N. (2016). Mathematics is a science and a profession. Moscow: URSS
- [17] Kolyagin Y.M. (2001). Russian school and mathematical education: our pride and our pain. Moscow: Prosveschenie
- [18] Kovalev, F.V. (1989). Golden section in painting. Kiev: Vysshaya shkola
- [19] Liu, P.-H. (2009). History as a platform developing college students' epistemological beliefs of mathematics. International Journal of Science and Mathematics Education, 7, 473-499
- [20] Mader, V.V. (1995). Introduction to the methodology of mathematics (epistemological, methodological and philosophical aspects of mathematics, Mathematics and epistemology). Moscow: Interprax
- [21] Mankevich, R. (2011). History of mathematics. From counting sticks to countless universes. Moscow: Lomonosov
- [22] Merzbach U. C., Boyer C. B. (2011). A History of Mathematics. New York: John Wiley and Sons
- [23] Perminov, V. Y. (2001). Philosophy and foundations of mathematics. Moscow: Progress-Tradition
- [24] Polyakova, T.S. (2002). History of mathematical education in Russia. Moscow: Publishing house of Moscow University
- [25] Prasolov, V.V. (2015). History of mathematics. Part 1 (mathematics until the end of the 17th century). URL: <http://www.twirpx.com/file/1682575/>
- [26] Rauschenbach, B.V. (1986). General theory of perspective. Moscow: Science
- [27] Rios D. F. (2016). Memories of the Former Students of Colégio de Aplicação da Bahia: contributions to History of Mathematics Education. Bolema, Rio Claro (SP), 30(56), 1223-1243
- [28] Rybnikov, K.A. (1994). History of mathematics. Moscow: Moscow State University
- [29] Rybnikov, K.A. (1995) Introduction to the methodology of mathematics. Moscow: Moscow State University
- [30] Schneps L. (2014). Alexandre Grothendieck: A Mathematical Portrait. Cambridge: International Press of Boston
- [31] Shackelford, J. (2016). Western Science from Greek Antiquity to Quantum Physics. Science & Education, 25:9, 1149-1151
- [32] Steklov, V.A. (2010). Mathematics and its importance for humanity. Moscow: URSS
- [33] Stillwell, J (2001). Mathematics and its history. New York: Springer
- [34] Stroyk, D.Y. (1990). A short sketch of history of mathematics. Moscow: Science
- [35] Van der Waerden BL (2010). Awakening Science: The Mathematics of Ancient Egypt, Babylon and Greece. Moscow .URSS
- [36] Varankina, V.I. (2015). The academic discipline "History and methodology of mathematics" for graduates-mathematicians. Modern problems of science and education, 5. URL: [www.science-education.ru/128-21878](http://www.science-education.ru/128-21878)
- [37] Varankina, V. I. & Vechtomov, E.M. (2009). Scientific Algebraic School. Herzen: Vyatsky notes, 15, 99-207
- [38] Varankina, V. I. & Vechtomov E.M. (2015). The first graduate schools on the Vyatka land. Bulletin of VSHU, 11, 131-135
- [39] Varankina, V. I. & Vechtomov E.M. (2016). Continuous mathematical education. Mathematical bulletin of pedagogical universities and universities of the Volga-Vyatka region, 18, 6-19
- [40] Varankina, V.I., Vechtomov, E.M. & Kanin, E.S. (2014). Professor Fedor Nagibin. Through the prism of time. Kirov: Publishing house of VSHU, LLC "Loban". (Series "Scientific and pedagogical heritage of VSHU", V. I)

- [41] Varankina, V. I., Vechtomov, E. M. & Mordkovich A.G. (2014). Mathematical Education in the Vyatka State University of Humanities. Materials of the XXXIII International Scientific Seminar of Teachers of Mathematics and Informatics of Universities and Higher Educational Institutions, dedicated to the 100th anniversary of VSHU. Kirov: Publishing house of VSHU, Publishing house "Raduga-PRESS", 4-18
- [42] Vechtomov, E.M. (2013a). Basic mathematical structures. Kirov: Publishing house "Raduga-PRESS"
- [43] Vechtomov, E.M. (2013b). Philosophy of mathematics. Kirov: Publishing house "Raduga-PRESS"
- [44] Vechtomov, E.M. (2015a). Mathematics as the study of the boundaries of scientific knowledge. Bulletin of VSHU, 4, 6-14
- [45] Vechtomov, E.M. (2015b). An elective course of "Functional Algebra and Semirings" for postgraduate mathematicians. Modern problems of science and education, 2. URL: <http://www.science-education.ru/129-21879>
- [46] Vechtomov E.M. & Varankina V.I. (2015). Development of functional algebra in Vyatka State University of Humanities. Bulletin of VSHU, 5, 136-144
- [47] Voloshinov, A. V. (1992). Mathematics and art. Moscow: Prosveschenie, 336 p
- [48] Vygotsky, M.Y. (1967). Arithmetic and Algebra in the Ancient World. Moscow: Science
- [49] Weyl, G. (2005). On philosophy of mathematics. Moscow: URSS
- [50] Youchu, H. (2016). A Qualitative Study on the Development of Pre-service Teachers' Mathematical Knowledge for Teaching in a History-based Course. EURASIA Journal of Mathematics, Science and Technology Education, 12(9), 2599-2616